Instructions Session 1 Count the Dots - Binary Numbers

Taken from Count the Dots – Binary Numbers:
https://www.stem.org.uk/elibrary/resource/32374

Introduction

In this session you will look at what a binary numbers. Understanding how numbers are made in binary will help you access the next session on images. Steps 1 to 9 explains the activity to be done which is to fill in a table making binary numbers (Session1_Worksheet). The extension does not need to be done to understand the next session however, it will help you gain a deeper understanding of how computers work.

Preparation

For this session you will need these files:

Binary_Numbers_Booklet (You may want to print this)

Session1_Worksheet

Session1_Worksheet_Answers

This is an unplugged session. That means it is designed to not need a computer.

1. Before you start cut out one row of the cards on page 6. You only need five cards. (one dot, two dots, four dots, eight dots and sixteen dots). If you are reading this on screen then you will need to make the five cards to help you.
2. Now put the cards in order biggest on the left and smallest on the right. 16, 8, 4, 2, 1.
3. Discussion/think about: What do you notice about the number of dots on the cards? (You should notice each card has twice as many as the card to its right.)
4. How many dots would the next card have if we carried on with this pattern to the left? (answer 32 because it is double 16).
5. We can use these cards to make numbers by turning some of them face down and adding up the dots that are showing. Turn them all over to make 0 . Turn the card on the right (one dot) over to make 1.
6. Page 5 explains the cards and what to do. Use this to get familiar with making binary numbers.
7. When you feel ready fill in the table (Session1_Worksheet) to make every number from 0 to 31 (this can be done).
8. Use Session1_Worksheet_Answers to check your work.
9. **Optional Extension:**
10. If you found making binary numbers easy the other activities in the Binary_Numbers_Booklet are designed to stretch you. Try them and use the solutions on page 13 to check your work. If you have not printed the booklet you will need somewhere to write down your answers to the questions.